

REMARKS

Claims 1 to 3, 5, and 7 to 13 are pending, of which claim 1 is independent. Favorable reconsideration and further examination are respectfully requested.

Claims 1 to 3 and 5 to 13 were rejected for allegedly failing to comply with the enablement and written description requirements.¹

In the "Response To Arguments" section, the Office Action addresses our prior argument as follows:

Applicant's first argue that the limitation that the second ceramic material have a relative permittivity ϵ_2 which is at least two times as high as a relative permittivity of the first ceramic material ϵ_1 . The argument is based on the specific disclosure found, for example, in claim 6 of 7 $\leq \epsilon_1 \leq 8.5$ and $18 \leq \epsilon_2 \leq 22$. Applicant's argue that since the minimum value of ϵ_2 (18) is greater than twice the value of ϵ_1 ($8.5 \times 2 = 17$) that support is found for the limitation.

This is not found persuasive because this example does not provide support for the broader limitation recited in claim 1 that ϵ_2 is at least two times as high as ϵ_1 . While specific examples given do fall within this limitation, the limitation also covers a great amount of area that falls outside of the disclosed example (for example, $\epsilon_1 = 1 \epsilon_2 = 3$). While support is found for a small range of examples which fall within the limitation that ϵ_2 is at least two times as high as ϵ_1 , because current claim 1 covers so much which falls outside of the specific example of current claim 6 the specification as originally filed is not found to support the broader limitation.

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We do not understand the Examiner's argument. In particular, the claim language, prior to amendment, read as follows:

the stack comprises a second ceramic material having a relative permittivity which is at least two times as high as a relative permittivity of the first ceramic material.

¹ Office Action, pages 2 and 3

² Office Action, page 10

We note that the written description requirement does not require that the specification only describe embodiments that the claim language covers. In this case, as pointed out by the Examiner, the specification describes an embodiment in which ϵ_2 is 18 and ϵ_1 is 8.5. Since 18 is more than twice 8.5, there is sufficient written description for the claimed feature. The Examiner points out that the claims cover an area that falls outside the disclosed example. In response, we note that it is elemental that the claims define the metes and bounds of the invention. The claims, therefore, may cover more than what is described in the specification without running afoul of the written description requirement.

As described in MPEP §2163.02

The courts have described the essential question to be addressed in a description requirement issue in a variety of ways. An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed. The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon "reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter." *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)).

Whenever the issue arises, the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. See, e.g., *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). Possession may be shown in a variety of ways including description of an actual reduction to practice, or by showing that the invention was "ready for patenting" such as by the disclosure of drawings or structural chemical formulas that show that the invention was complete, or by describing distinguishing identifying characteristics sufficient to show that the applicant was in possession of the claimed invention. See, e.g., *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998); *Regents of the University of California v. Eli Lilly*, 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir.

1997); Amgen, Inc. v. Chugai Pharmaceutical, 927 F.2d 1200, 1206, 18 USPQ2d 1016, 1021 (Fed. Cir. 1991) (one must define a compound by "whatever characteristics sufficiently distinguish it").

Thus, to satisfy the written description requirement, the issue is not whether the claims cover embodiments not disclosed in the application, but rather whether the specification "convey[s] with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention". It is our opinion that the specification does this clearly.

Nevertheless, in order to advance prosecution, independent claim 1 has been amended to include the features of former dependent claim 6. The relevant portion of amended claim 1 now reads as follows:

wherein a first layer of the stack comprises a first ceramic material, and a second layer of the stack comprises a second ceramic material;

wherein, following sintering, the first ceramic material has a relative permittivity ϵ_1 , where $7 \leq \epsilon_1 \leq 8.5$; and

wherein, following sintering, the second ceramic material has a relative permittivity ϵ_2 , where $18 \leq \epsilon_2 \leq 22$.

These features, although not verbatim, are believed to be found in the original claims.³ As stated in MPEP §2163(I)(A):

There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed. In re Wertheim, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976) ("we are of the opinion that the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims"). However, as discussed in paragraph I., supra, the issue of a lack of adequate written description may arise even for an original claim when an aspect of the claimed invention has not been described with sufficient particularity such that one skilled in the art would recognize that the applicant had possession of the claimed invention. (emphasis added)

We therefore turn to the enablement rejection.

³ This application is based on a German-language PCT application. The claims have been amended to ensure that they comply with standard English and U.S. rules.

Initially, we note that the Office Action indicates that all of the claims are not enabled, but only specifically addresses former dependent claim 6. Since features of claim 6 are now part of independent claim 1, we address the Examiner's comments with respect to amended claim 1.

The Office Action states the following:

Claims 1-3 and 5-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is maintained from the previous Office action mailed 9 July 2008 and is maintained here. Applicant's comments regarding this are addressed below in the "Response to Arguments" section.

Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In the current case the use of a second ceramic material having a relative permittivity ϵ_2 , where $18 \leq \epsilon_2 \leq 22$ is found to not be enabled. 4

The Office Action further states:

⁴ Office Action, page 2

Given all of the above factors, it is deemed that claim 6 is not enabled, in that one of ordinary skill in the art would not know from the teachings of the specification and the prior art what ceramic materials could be used to make a layer for use in a ceramic substrate that would have a permittivity of 18-22. Courts have previously found that if certain chemicals are required to practice an invention, the application must provide a sufficient disclosure of the apparatus if it is not readily available. Based on the searching done by the Examiner, ceramic materials which could be used in forming layers for a ceramic substrate do not appear to be readily known or available, and since no disclosure of such is present in the application, the making of a ceramic substrate using these materials is found to not be enabled.

We respectfully disagree. Since the Examiner appears only to have an issue with the range of ϵ_2 , we will not address ϵ_1 , where $7 \leq \epsilon_1 \leq 8.5$.

In this regard, it is our position that one of ordinary skill in the art would have understood how to manufacture a K20 material at the time this application was originally filed. We note the following example, which was provided to us by the law firm responsible for this case in Germany. An example dielectric material may include Al_2O_3 , along with different kinds of glass, including SiO_2 , NaO_2 , MgO , and other oxides. Prior to debinding, the dielectric may also include a binder, which is usually organic, and which is removed during debinding. It is our position that one of ordinary skill in the art would know how to increase and/or decrease the relative permittivity of the dielectric by adding chemicals in the appropriate amounts to produce a K20 material. We additionally note that dielectric constants are also a function of heat treatment during sintering, which would also be controlled to produce the K20 material.

On page 4 of the Office Action, the Examiner notes

c) The state of the prior art is that it was known to make similar ceramic substrates using a heating cycle which meets the current claim limitations, but using materials to make the layers which do not have a relative permittivity of 18-22 (for example; Herron, US Patent 4,627,160). Further, ceramic materials known to have a relative permittivity of 18-22 and useable in forming methods used to create the layers which form ceramic substrates (such as tape casting) do not appear to be known in the art.

Rather than taking this as an indication that the claims are not enabled, we see this as an indication that the claims are patentable over the prior art.

In this regard, the Office Action maintains the previous rejections of claims 1, 2 and 5 to 9 over Herron (U.S. 4,627,160); claim 3 over Herron in view of Nakatani (U.S. 5,252,519); claim 10 over Herron in view of Harada (U.S. 2001/0022416); and claims 11 to 13 over Herron, Harada, and Tamhankar (U.S. 5,230,846).⁵

As shown above, features of claim 6 have been incorporated into independent claim 1. Therefore, this should be viewed as a traversal of the rejection of claim 6. In particular, we do not understand the applied art to disclose or suggest at least the following underlined features:

1. A method of producing a ceramic substrate comprised of a base that comprises a stack of layers, each layer in the stack comprising a non-sintered ceramic material and a binder, the method comprising:
 - debinding the layers in a temperature interval of $T_{E1} - T_{E3}$, where T_{E1} is a minimum debinding temperature and $T_{E3} > T_{E1}$; and
 - sintering the layers at a temperature T_S , where $T_S \geq T_{E3}$;
 - wherein debinding and sintering are performed in a same furnace; and
 - wherein a temperature T of the base does not fall below T_{E1} during debinding and sintering;
 - wherein at least two of the layers comprise different ceramic materials; and
 - wherein a first layer of the stack comprises a first ceramic material, and a second layer of the stack comprises a second ceramic material;
 - wherein, following sintering, the first ceramic material has a relative permittivity ϵ_1 , where $7 \leq \epsilon_1 \leq 8.5$; and

⁵ It appears, on page 5, that the Office Action rejects claim 3 over Herron alone, but the text on page 7 indicates that the rejection is over Herron and Nakatani.

wherein, following sintering, the second ceramic material has a relative permittivity ϵ_2 , where
 $18 \leq \epsilon_2 \leq 22$.

Initially, we note that the Examiner considers the foregoing underlined features to be obvious even though they are not found in the art. In particular, the Examiner states the following:

While Heron does not disclose the relative permittivities of the materials used, it would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to use materials which satisfy the permittivity limitations of claims 1 and 6 in order to form a laminated ceramic substrate since the relative permittivities of the materials used is known to effect how well they operate as an insulator in the structure. The optimization of the permittivities in order to create a substrate having the desired level of insulation between layers would have been well within the ability of one of ordinary skill in the art, and would have had the predictable result of adjusting the insulating characteristics of the finished substrate. "[W]here the general conditions of a

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However, this argument is logically inconsistent with the Examiner's reasoning for rejecting claim 6 for non-enablement, which is as follows:

Given all of the above factors, it is deemed that claim 6 is not enabled, in that one of ordinary skill in the art would not know from the teachings of the specification and the prior art what ceramic materials could be used to make a layer for use in a ceramic substrate that would have a permittivity of 18-22. Courts have previously found that if

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On the one hand, the Examiner essentially argues that the features of claim 6 would have been so obvious to one of skill in the art that it is not necessary to provide a reference showing them to invalidate claim 6. On the other hand, the Examiner essentially argues that the features of claim 6 are so unknown to one of skill in the art that claim 6 is not enabled. Respectfully, we do not

⁶ Office Action, page 6

⁷ Office Action, page 5

see how both positions can be maintained at the same time. Since we have addressed the enablement rejection above, we will focus on the art rejection at this point.

As acknowledged in the Office Action, Herron does not disclose or suggest the permittivity (ϵ_1, ϵ_2) ranges of claim 1. We submit that the very specific permittivity ranges claimed here would not have been obvious, particularly where the art is silent as to permittivity. We note the following rationale for rendering the foregoing permittivity limitations obvious despite a lack of supportive evidence in the prior art:

While Heron does not disclose the relative permittivities of the materials used, it would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to use materials which satisfy the permittivity limitations of claims 1 and 6 in order to form a laminated ceramic substrate since the relative permittivities of the materials used is known to effect how well they operate as an insulator in the structure. The optimization of the permittivities in order to create a substrate having the desired level of insulation between layers would have been well within the ability of one of ordinary skill in the art, and would have had the predictable result of adjusting the insulating characteristics of the finished substrate. [W]here the general conditions of a

In this regard, we note that insulating characteristics between layers are proffered by the Office Action as a reason as to why the claimed ranges are obvious. We note, however, that advantages of the invention result from using layers of the claimed relative permittivities, and ensuring that “a temperature T of the base does not fall below T_{EI} during debinding and sintering”. By virtue of this combination, it is possible to reduce structural damage in the resulting ceramic substrate.⁹

We do not believe that the advantages resulting from this combination are so foreseeable as to render it unnecessary to provide a reference for the claimed permittivity ranges. Accordingly,

⁸ Office Action, page 6

⁹ See, e.g., pages 2 and 5 of the application.

we submit that the rationale provided in the Office Action is insufficient, and that the independent claim 1, as amended, is patentable over the applied art.

For at least the foregoing reasons, claim 1 is believed to be patentable over the art.

Dependent claims are believed to define patentable features. Each dependent claim partakes of the novelty of its corresponding independent claim, in light of the foregoing amendments, and, as such, has not been discussed specifically herein.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the foregoing amendments and remarks, we respectfully submit that the application is in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Please charge any additional fees, or credit any overpayment, to deposit account 06-1050, referencing Attorney Docket No. 14219-074US1.

Applicant : Anke Althoff et al
Serial No. : 10/523,345
Filed : October 11, 2005
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Attorney's Docket No.: 14219-074US1 / P2002,0642USN

REQUEST FOR TELEPHONE INTERVIEW

If the foregoing arguments do not place the application in condition for allowance, the Examiner is respectfully requested to contact the undersigned to arrange a telephone interview prior to issuing a new action.

Respectfully submitted,

April 21, 2009
Date: _____

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